PROCEEDINGS OF THE
ROYAL ENTOMOLOGICAL SOCIETY
OF LONDON

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ORDINARY MEETING.

WEDNESDAY, 3rd APRIL, 1957, at 5.30 p.m.

AGENDA.

1. Confirmation of the Proceedings of the Ordinary Meeting held on 6th March, 1957.

2. Recommendations of candidates for Fellowship. First reading.

3. Recommendations of candidates for Fellowship. Second reading.

4. Announcement of election of new Fellows.

5. Additions to the Library [see p. 10].

6. Admission of Fellows.

7. Exhibits.

Fellows are particularly requested to bring suitable exhibits to the Meeting even though it may not be possible to announce their intention to do so beforehand.

> *Note.*—To avoid congestion in the Library and to enable exhibits to be displayed to greater advantage, a table has been placed in the meeting-room for this purpose. Fellows are asked to place their exhibits on this table, with a suitable explanatory note, as soon as possible on the afternoon of the meeting, so that they are available for inspection there before the meeting opens.

8. Communications.

Dr. P. S. Corbet.

Freshwater entomology in the lakes and rivers of East Africa.

[ABSTRACT.]

The lakes and rivers associated with the upper regions of the White Nile (including the Victoria Nile) contain diverse and interesting habitats. Some of these will be described and illustrated with colour photographs.

Certain features of the biology of the aquatic insects will be described and discussed and, in some cases, illustrated with photographs. The orders mentioned are the Ephemeroptera, Odonata, Hemiptera, Trichoptera and Diptera. The subjects to be discussed include: diurnal rhythm of flight activity; lunar rhythm of emergence; the life-history of *Zygonyx natalensis* (Martin), a dragonfly living under torrential conditions; larval growth-rate at high temperatures; factors inducing morphological variation in larvae; protective resemblance and mimicry in adult Odonata. Reference will be made to the problematical " Spider Islands " which are a well-known feature of Lake Victoria.

TEA will be served in the Library before the meeting.

NOTICES.

Provision of refreshments after Ordinary Meetings.

Coffee and biscuits will be available in the Library after the meeting on payment of one shilling per person. Fellows intending to stay for these refreshments are asked to sign the list beside the Attendance Book before 5.30 p.m.

The Library will continue to be closed at the end of the meeting.

Forthcoming Ordinary Meetings.

Preliminary notice is given below of the principal papers to be read at the next two Ordinary Meetings.

1st *May*, 1957.

A film on stridulation and behaviour of grasshoppers and crickets

5th *June*, 1957.

Dr. H. E. Hinton.—The function of the tissue isolated in the pupal gill of a Tipulid at the pupa-adult moult.

PROCEEDINGS OF THE ORDINARY MEETING HELD ON 6TH MARCH, 1957.

Professor O. W. RICHARDS, President, in the Chair.

Present, 84 Fellows and 13 Visitors.

The minutes of the Ordinary Meeting held on 16th January and of the Annual Meeting held on 6th February, 1957, were confirmed and signed by the President.

The President announced that he had nominated Mr. Paul Freeman, Dr. W. J. Hall and Mr. W. V. Harris as his Vice-Presidents for the coming year.

The names of the following candidates for election were read for the first time: Mr. Brian Robert Baker, B.Sc.; Mr. Sidney Herbert Blunt; Mr. Deb Kumar Choudhuri, M.Sc.; Mr. Michael Frederick Claridge, B.A.; Mr. Lionel Ray Cole; Dr. Giovanni De Lotto; Mr. Rennie Friendship, B.Sc.; Mr. Peter Waller Hanney, B.Sc.; Mr. Leslie Hender; Mr. Nicholas David Jago; Dr. W. J. Le Quesne; Mr. Albert George Long, M.Sc.; Mr. Graham Anthony Matthews; Mr. Francis Anthony Noble; Mr. Ronald George Pearson; Dr. J. Risbec; Mrs. Joy Opal Irene Spoczynska; and Mr. Richard Underwood.

For the second time (taken as read): Mr. Gordon Leonard Ayre; Mr. Robert Herbert Carcasson; Mr. Christopher Derek Green; Mr. John C. Moser; Mr. Thomas Risley Odhiambo; Mr. Thomas Hugh Pennington; Mr. Robert Dennis Pope; Dr. Hywel Roberts, B.Sc., Ph.D.; Mr. Brian Michael Swan; and Mr. Paul Ernest Sutton Whalley, B.Sc.

The President announced that the following had been elected Honorary Fellows of the Society:

Dr. W. R. Thompson, F.R.S., Commonwealth Institute of Biological Control, Ottawa, Ontario, Canada.

Dr. B. P. Uvarov, C.M.G., F.R.S., Anti-Locust Research Centre, London, S.W.7.

Dr. C. B. Williams, F.R.S., Ard Insh, Kincraig, Inverness-shire.

The Secretary read the names of the following newly elected Fellows of the Society: Major Alan Egerton Collier, M.C., B.A., Lynher, Horsham Road, Cranleigh, Surrey; Mr. John Colin Hartley, The Poplars, Fulbourn, Cambridgeshire; Mr. Kenneth Charles Higham, Zoology Department, The University, Sheffield, 10; Mr. Brian John Selman, " Highlands ", Stinchcombe Hill, Dursley, Glos.; Mr. Maurice E. Solomon, M.Sc., D.S.I.R. Pest Infestation Laboratory, London Road, Slough, Bucks.; and Mr. David Walter Sutcliffe, B.Sc., Department of Zoology, King's College, Newcastle-upon-Tyne, 1.

Thanks were voted to donors of gifts to the Library since the last meeting.

Lt.-Col. W. Bowater and Dr. P. B. Cornwell signed the Obligation Book and were admitted Fellows of the Society.

Mr. H. Oldroyd, on behalf of **Dr. H. E. Paterson,** of Johannesburg, exhibited photographs showing courtship behaviour in a Trypetid fly, *Afrocneros mundus* (Loew). The male circled the female, opening and closing his wings in a way common in some families of acalyptrate flies. He then began to produce foam from the labella of the proboscis, building up a pile about 2 mm. high. When the female was feeding upon the foam the male was able to mount. A number of neglected and uneaten foam piles were seen, showing that the formation of a pile did not always lead to successful courtship.

Dr. Paterson pointed out that an offering of food as an inducement to mating has hitherto been described in predatory flies, such as Empididae, and in Mecoptera. It has been suggested that the gift of food might occupy the attention of the female, and reduce the risk of her attacking the male. The fact that the Trypetidae are not predatory throws doubt on this explanation.

The President said that there were records of offerings of food prior to mating in non-predatory flies, e.g. in *Calobata*. Predatory flies usually offered solid food.

Dr. H. E. Hinton said that in *Hilara* the males offered flies wrapped in silk, which they produced, and the President pointed out that some offered silk only.

Mr. Dennis Leston played a magnetic tape recording of male stridulation under water by *Sigara dorsalis* (Leach) (Hemiptera: Corixidae), a common British pond insect. The presence of two calls, reported by Ball in 1845, has been confirmed: call A is emitted spontaneously, at times in response to artificial stimulation, and is tentatively regarded as a " common song ". This call is markedly varied as temperature rises between 14° C. and 22° C. Call B is much quieter and longer and is perhaps a courtship call.

In reply to a question by Professor G. C. Varley, Mr. Leston said that the palae played no part in the emission of call A, which was made by rubbing the sides of the head with the fore-coxal bristle area (" schrillfeld " of von Mitis).

Following comments by Dr. P. T. Haskell, Professor V. B. Wigglesworth and Dr. Hinton, Mr. Leston remarked that C.R. oscillograms suggested that call A had a regular pulse rate and that subaquatic communication amongst these bugs followed the same lines as have been demonstrated are followed by terrestrial insects.

The Hon. Miriam Rothschild gave a paper on some observations on the Garden Tiger Moth, *Arctia caja* L., an abstract of which appeared on pages 1–2.

Dr. J. F. D. Frazer reported that he and Dr. G. W. Bisset had examined extracts of legs of *A. caja* for pharmacological activity. Extracts of the tibial spines, coxae and the rest of the legs in 0·9 per cent. saline, when tested on the isolated ileum of the guinea-pig, produced a slow, delayed contraction. The active principle in the extracts could be distinguished from acetylcholine, histamine and 5-hydroxytryptamine ; these substances, which are present in wasp venom and nettle sting, elicit an immediate response and can be identified by the use of specific inhibitors. It is thought that the active principle in *A. caja* may act similarly to trypsin and other substances by causing a release of endogenous histamine from the tissue of the test preparation. Extracts of the legs of the Scarlet Tiger Moth, *Panaxia dominula* (L.), were inactive.

Dr. Hinton described the morphology of the leg of *A. caja*, including a new gland ; an abstract of this talk appeared on page 2.

Miss Rothschild read a letter from Mr. L. Hugh Newman, in which he said that he had frequently been stung when handling Privet, Poplar and Eyed Hawk moths. They appeared to sting when they had been held between finger and thumb and had subsequently wriggled free, i.e. when alarmed.

Miss Rothschild also read a letter from Dr. H. B. D. Kettlewell, who said that, when handling *A. caja*, he had felt pricks on many occasions but that no reaction was ever observed.

Professor Varley said that he wondered if the three different puzzles presented here were in fact correlated. He said that arctiids contained some odd substances and drew attention to experiments in which bats accepted noctuids but would refuse arctiids. When the blood of arctiids was injected into noctuids, the bats refused the latter also. He also asked how widespread were the glands and whether the fluid issuing from the legs of ladybirds, usually called " blood ", might not come from an apodeme gland as in *Arctia*.

Dr. Hinton replied that there was no relation between the glands of *Arctia* and the defensive glands of ladybirds.

Dr. Frazer said that toads offered corpses of *Panaxia dominula* would take them but would immediately spit them out.

Miss Rothschild said that toads and birds would reject *A. caja*, but would reject *P. dominula* even more violently.

The President pointed out that a nasty taste was no evidence of stinging properties.

Dr. Hinton then said that these moths have defence glands in the prothorax, the secretion of which has a strong taste. He pointed out that no other moths stung and that Packhard had stated that, as a general rule, animals that smell or taste unpleasant do not sting, while animals that sting do not smell or taste badly.

The President said that in Hymenoptera it had been shown that both hive bees and bumble bees were distasteful to birds, even after the stings had been removed.

Mr. W. H. Potts gave a paper on some effects of gamma rays on tsetse pupae (*Glossina morsitans* Westw.), an abstract of which appeared on page 2.

Dr. J. MacLeod said that similar experiments had been carried out with the Sheep Maggot fly, *Lucilia sericata.* When working with pupae which would develop in 9 days, those which were 3 days old or younger died after irradiation, whereas those 4 days old and upwards survived. The sterilising dose is about the same as in *Glossina* (*c.* 6000 Röntgens). Sterilised *L. sericata* had been released on Holy Isle in an effort to eliminate the species there. Some difficulties had been encountered in this work, e.g. the discovery that radioactive labelling of pupae was associated with a high mortality, while irradiation caused a reduction in length of life but did not cause late pupal mortality. It had been found impossible to separate the sexes, so both males and females had been released on Holy Isle.

Mr. J. Donnelly said that results of the tests which Dr. Macleod had described were in agreement with Mr. Potts' findings. The results of irradiation had been more severe in females than in males. With 3000 Röntgens, the female ovaries did not develop, but males were not completely sterilised under 6000 Röntgens. They produced sperm, which the females received, up to 24,000 Röntgens. The sperm appeared morphologically normal but motility decreased with dose. There was no tail movement after a dose of 24,000 Röntgens.

Dr. K. Mellanby said that these experiments could only be of very limited application in the control of the insects, since they involved swamping populations with infertile males. Control could not be exercised over large areas and therefore the experimenters should not be over-optimistic. He asked whether Mr. Potts had mated normal females with sterilised males and if eggs had piled up inside the female. Mr. Potts replied that he had, and they did accumulate in a few cases, as in some normal male and female matings.

Mr. J. D. Bletchly said that irradiation experiments had been carried out with Furniture and Death Watch beetles and it had been found that the age at the time of irradiation affected the result. In adults of *Lyctus*, the females were more resistant than the males, as in the Screw Worm fly, where Lindquist had found that males were sterilised at 3000 Röntgens, but that females needed 5000 Röntgens. Lindquist had pointed out the importance of releasing only sterilised males.

Dr. P. B. Cornwell said that 17 species of insects had been irradiated at Harwell. Pupae of *Calandra granaria* irradiated up to 23 days did not emerge, while when irradiated at 24 days all emerged, i.e., the duration of sensitivity was very critical, down to a matter of hours. He said that, as well as causing loss of longevity in adults, irradiation also shortened larval life, causing a diapause, so that the larvae did not pupate. Irradiation in small amounts of 250–500 Röntgens appeared to stimulate the pupae and in *Calandra* produced a greater emergence rate.

There were two views on the actual effect of irradiation :

(1) The " direct hit " view.

(2) Indirect chemical effect, *via* hormones, and the possible production of poisons.

E. B. BRITTON, *Honorary Secretary.*

The next meeting will be held on 1st May, 1957.

ADDITIONS TO THE LIBRARY.

Presented.

Contributions à l'étude de la faune entomologique du Ruanda-Urundi (Mission P. Basilewsky 1953). 3me parte. *Ann. Mus. Congo belge 8vo.* (*Zool.*) **51** : 610 pp. 1956. [Musée du Congo Belge, Tervuren.]

Laffoon, J. L. A revision of the Nearctic species of Fungivora (Meigen) (Diptera, Mycetophilidae). *Iowa St. Coll. J. Sci.* **31** : 141–340. 1956. [The Author.]

Oldroyd, H. *The Horse-flies* (*Diptera : Tabanidae*) *of the Ethiopian Region.* Vol. III. *Subfamilies Chrysopinae, Scepsidinae and Pangoniinae.* 8vo. London, 1957. [Trustees of the British Museum.]

Purchased.

Baker, E. W. and others. *A manual of parasitic mites of medical or economic importance.* 8vo. New York, 1956.

Inoue, H. *Check list of the Lepidoptera of Japan.* Pt. 4. *Drepanidae-Notodontidae.* 8vo. Rikusuisha, 1956.

Needham, J. G. and Westfall, M. J. *A manual of the Dragonflies of North America* (*Anisoptera*). 8vo. Berkeley and Los Angeles, 1955.

Prueffer, J. *Study of the Butterflies of the Vilna district.* 8vo. Torun, 1947. [*In Polish with English summary.*]

United States. *Geographical and Geological Explorations and Surveys West of the One Hundredth Meridian.* Report, etc. Vol. V. Zoology. 4to. Washington, 1875.

In addition, separates have been presented by Dr. H. Scott ; United States Department of Agriculture ; British Museum (Natural History) ; The Director, E.A.T.R.O., Tororo ; Dr. J. J. Steyn ; Prof. G. C. Varley ; Mr. P. M. Miles ; Dr. A. E. J. Orian ; Mr. H. E. Box ; Mr. C. N. Smithers ; Mr. C. L. Collenette ; Anti-Locust Research Centre ; Mr. K. J. Joseph ; Miss C. Longfield ; Dr. W. E. China ; Dr. A. Nielsen ; State Plant Board of Florida ; Lt.-Col. J. N. Eliot ; Mr. V. Venkat Rao and Dr. A. A. Lisney.